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University of Toronto

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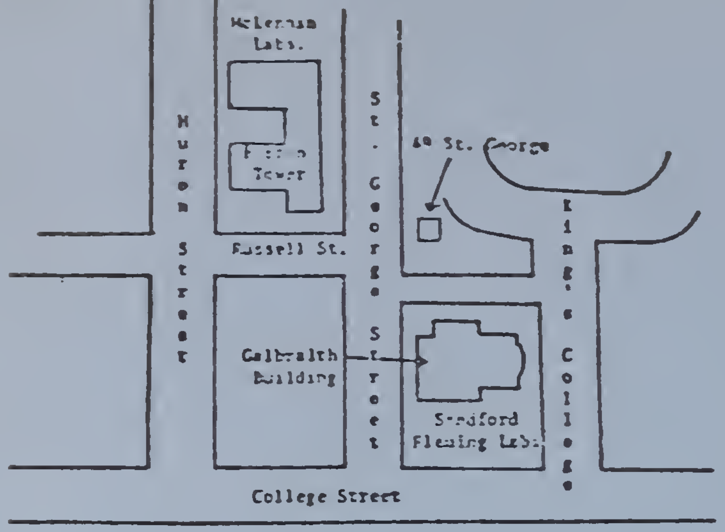
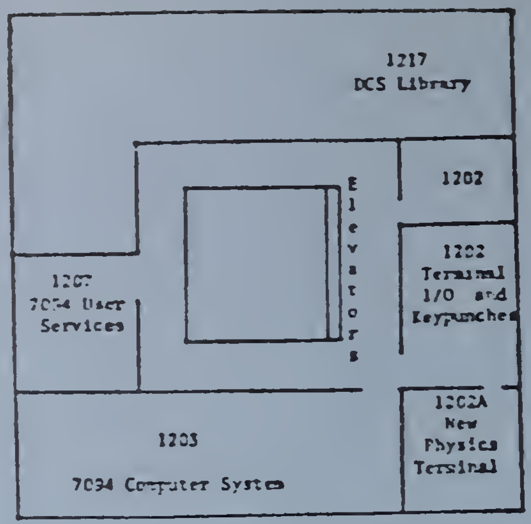
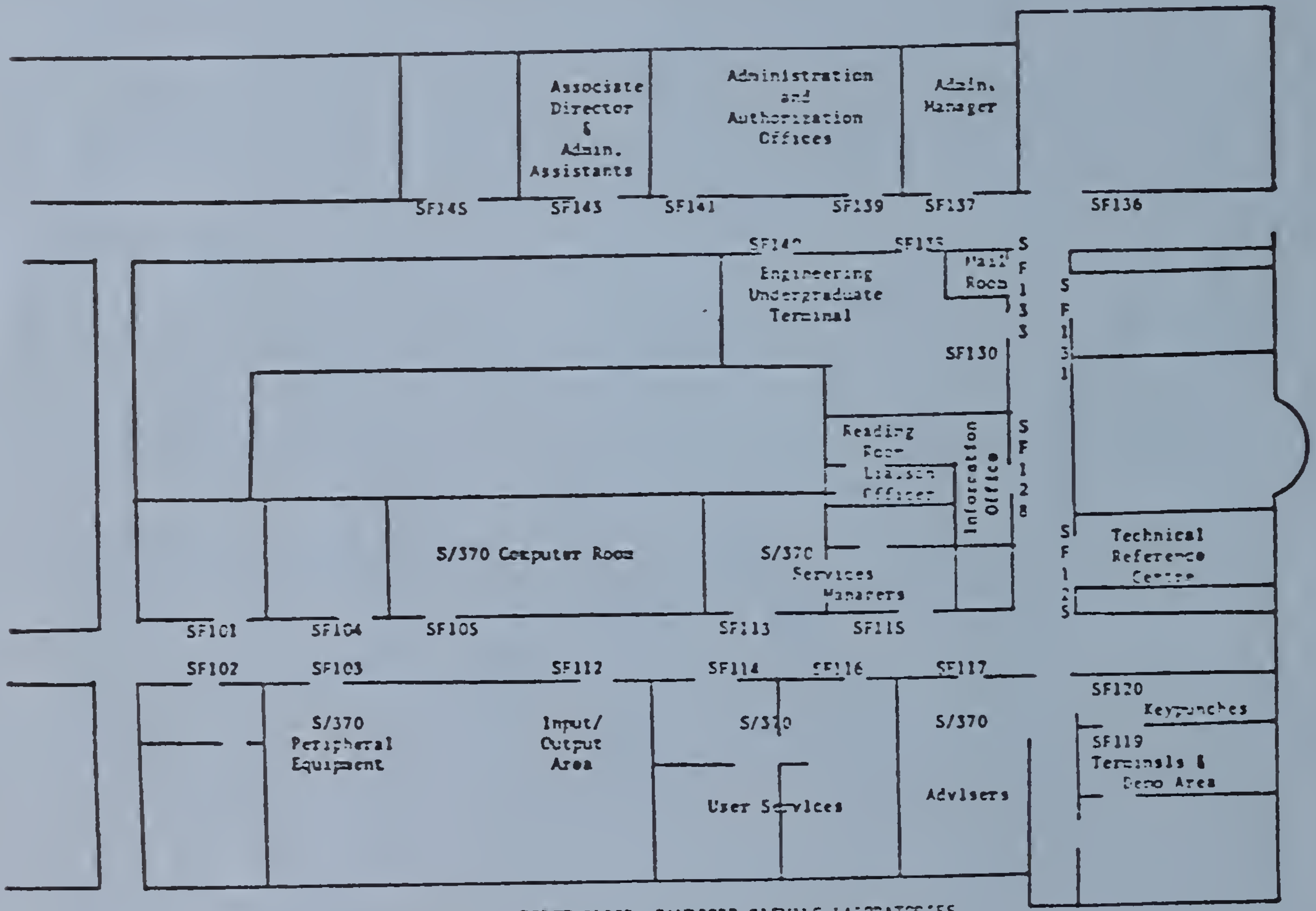


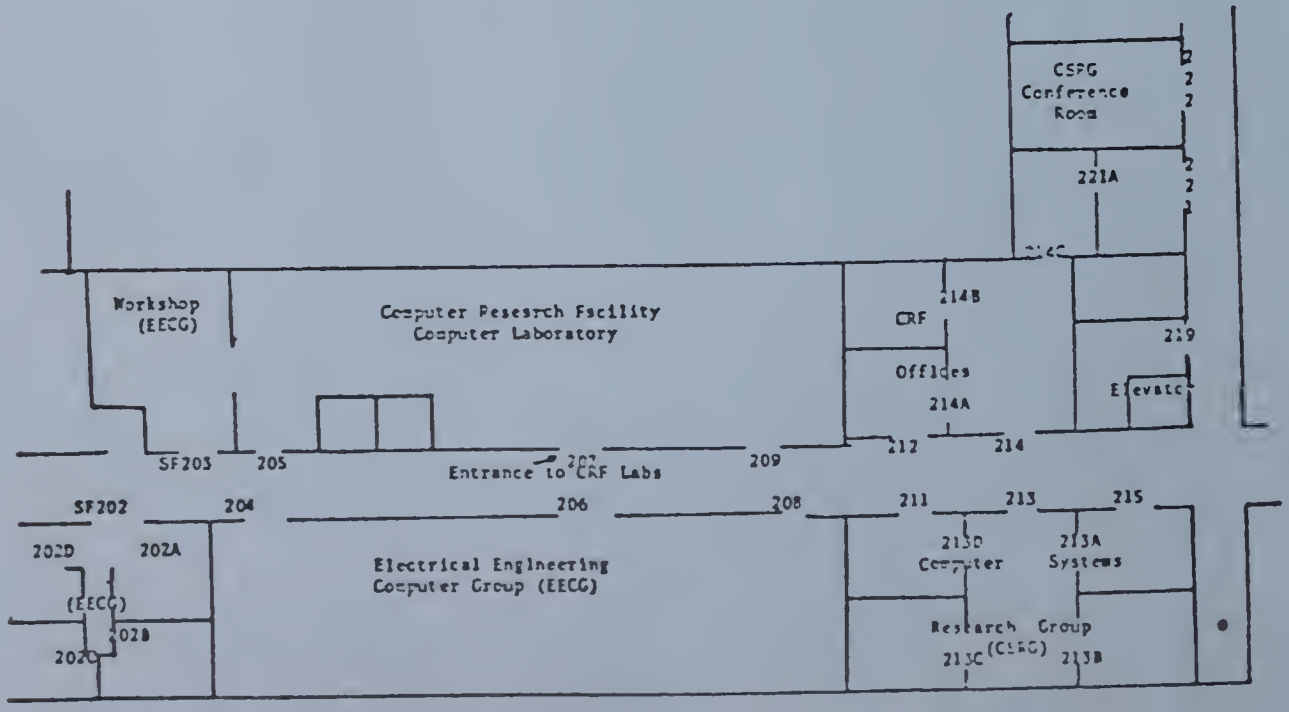


FLOOR PLAN: TWELFTH FLOOR, BURTON TOWER

UNIVERSITY OF TORONTO COMPUTER CENTRE



FLOOR PLAN: FIRST FLOOR, SANDFORD FLEMING LABORATORIES



FLOOR PLAN: SECOND FLOOR, SANDFORD FLEMING LABORATORIES

NEW EDITOR FOR COMPUTERNEWS

With this issue of COMPUTERNEWS we welcome our new editor, Janet Campbell. Janet has been with the Centre for several years and has worked with both the Operations and Services groups of S/370 Services in addition to spending a summer as console operator with CRF. Janet has been responsible for editing the S/370 section of COMPUTERNEWS and, in addition, has played a major part in the reorganization of UTCC's documentation into the present USERBOOK. Janet will be assisted by Lynne Jenkins.

I would like to take this opportunity to thank the UTCC staff members who assisted me in my role as Editor, contributing their time and efforts to help make COMPUTERNEWS an interesting and relevant publication. Special thanks go to Barbara Watkins, Ellen Jabs, June Bridges and a number of others for their ATS typing and proofreading assistance.

Bill Greene

COMPUTERNEWS ON INTERNATIONAL SERIALS DATA SYSTEM

Some of our readers may have noticed the additional registration number, ISSN 0315-4661 appearing on the front cover of COMPUTERNEWS. This number is the International Standard Serial Number which the National Library of Canada has assigned to this publication. The National Library of Canada is responsible for submitting information about Canadian serials to the International Serials Data System's central files in Paris. The purpose of ISDS is to provide an up-to-date record of world serial publications and each serial is given a unique number to facilitate its identification, location and ordering.

Janet Campbell

PLANNING FUTURE SERVICES

In May, a memorandum from the Director was sent to all University staff via the departmental computing representatives asking users to indicate their requirements for computer services beyond current UTCC offerings. About a dozen replies were received. Two types of service seem to be of interest.

a. A general purpose time-sharing service offering a full range of interactive facilities -- language processors, editors, etc. For example, one group indicated a requirement for interactive SNOBOL.

b. A batch, number crunching service for scientific users, to replace the 7094, but preserving the advantages of the 7094, i.e. low cost, quick turnaround and open shop operation when required.

...cont'd

PLANNING FUTURE SERVICES Cont'd...

It is fair to say that the initial response, although enthusiastic from some users, is not on a large enough scale to justify additional computer systems on campus. In order to provide potential users of such services with further details of the expected advantages of these services over those currently offered by UTCC, a fact sheet will be mailed to all account holders. A brief questionnaire will be attached. Account holders who feel that the general purpose time-sharing or scientific number crunching will be beneficial to their users' group are urged to discuss their users' requirements and return the questionnaire via the campus mail. Since the UTCC management will require definite indications that there are adequate economic grounds for establishing these services in the future, your co-operation in this matter would be greatly appreciated.

Anyone who is not an account holder and would like to receive a copy of the fact sheet and questionnaire can contact me at 928-4923.

John Phillips

UTCC INFORMATION SERVICES CHANGES

The Information Office was established in September, 1972 to provide UTCC users with a central outlet for computer manuals, general information and technical assistance referrals. Stan Yagi has assumed responsibility for the management of the UTCC Information Services in addition to his duties as Manager, S/370 Services. In order to provide users with additional information and reference resources, the services provided by Information Services now include the three areas described below:

1. Technical Reference Centre

The Technical Reference Centre located in Sandford Fleming room 128 maintains a reference collection of computer-related publications for the use of staff and users. This collection includes Conference Proceedings, technical reports, educational material, information on computer manufacturers, catalogues and directories, textbooks and manufacturers' technical publications relating to hardware, programming techniques, programming languages, programming systems (OS, VS, VM) and special applications.

A Software Resource Library is also maintained in connection with this function and will be offering a software exchange service for user written, unsupported programs.

Marg Doherty is in charge of the Technical Reference Centre and the Software Resource Library and inquiries concerning these facilities should be directed to her at 928-8995.

2. UTCC Publications

UTCC produces several publications of interest to users. Most users are familiar with USERBOOK, the official reference manual for UTCC. USERBOOK contains detailed documentation on the

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UTCC INFORMATION Cont'd...

hardware and software, services and facilities available at the University of Toronto Computer Centre. USERBOOK is updated on a regular basis and subscribers may take advantage of the free update service provided by the Information Office. Other publications include the S/370 Services series of Self Service Guides, COMPUTERNEWS, questionnaires, surveys and information brochures. The design and production of graphics displays, signs, murals and posters are also handled by the publication section of Information Services.

Janet Campbell has assumed editorial responsibilities for USERBOOK, COMPUTERNEWS and all special UTCC publications. Inquiries and suggestions concerning UTCC publications should be directed to Janet at 928-2066.

3. Information Office

The Information Office handles orders for data processing manuals not generally available through other campus outlets. It also provides a referral service for users seeking information about UTCC and functions as a distribution centre for UTCC-produced publications. Other services include user education programs such as the short courses listed in the schedule appearing elsewhere in this issue of COMPUTERNEWS, tours, User Forums and the Fall Open House for new users.

Don Gibson supervises the Information Office and users with questions or problems regarding any of these services should contact Don in SF128 or phone 928-5568.

John Wilson

ANNOUNCING DATATALK . . . DIAL 928-6710

UTCC is pleased to announce a new computing service, DATATALK. Truly conversational and as convenient as the nearest phone, DATATALK provides immediate answers.

Just dial 928-6710 and describe the calculation you need done. The DATATALK operator will program it, type in the numbers you dictate, and read the answers back to you, immediately, over the phone. You will also get your answers in writing via Campus Mail delivery.

DATATALK is designed to complement the full line of computing services now offered by UTCC by providing quick answers to small problems which require minimal input and output. Straightforward arithmetic calculations, of course, but also non-trivial computing, involving trigonometric and other mathematical functions, arrays, hexadecimal arithmetic, simple statistics, numerical integration, equation solution, curve fitting, interpolations and extrapolations are suitable problems for the DATATALK service. We're also prepared to handle linear programming problems, interest and mortgage calculations, multiple correlations, plotting, and a growing list of similar applications.

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ANNOUNCING DATATALK Cont'd...

DATATALK service is available Monday through Friday, 10 am to 10 pm. The cost is $12.50 per month, and enrolment takes just a two-minute phone call, after we receive written authorization from your UTCC account holder. For further information, just call us at 928-6710. A special DATATALK brochure and USERBOOK documentation are being prepared and will be available at the Information Office (SF128). For more details, see the article "Introducing DATATATALK" in this issue of COMPUTERNEWS.

Joyce Walton

PERSONNEL CHANGES

Leaving us this month is Barbara Casson of S/370 Services. Barbara will be staying at home raising a family. Best wishes Barbara!

Joining us are Sandra Hargreaves, computer operator and Tony Harminc, programmer, both of S/370 Services. Interactive Terminal Systems welcomes two programmers, Robert Evans and Doug Lacy. We hope you will enjoy working with us.

Trudy Holland

ROOM CHANGES

Users are advised of the following room changes:

The S/370 Services Authorization clerk, Barbara Ablett has moved from room 143 to room 115 in the Sandford Fleming Building. The telephone number remains 928-5557.

The Information Office supervisor, Don Gibson and the TRC Librarian, Marg Doherty will be moving from room 125 to room 128 in the Sandford Fleming Building within the next month.

Janet Campbell

5th ONTARIO UNIVERSITIES COMPUTING CONFERENCE

The 5th Ontario Universities Computing Conference was held June 3rd and 4th at the University of Western Ontario. The University of Toronto was represented by staff from UTCC as well as staff from other University of Toronto installations and several users of University of Toronto facilities. The conference drew attendants from coast to coast in Canada and from the northern U.S. states.

One of the major topics was planning -- planning both within the University as well as planning as it is affected by government and private sectors. The relationship between commercial service bureaus and university computer centres was discussed. A few universities are

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COMPUTING CONFERENCE Cont'd...

very involved in selling to commercial customers. The progress and planning of the combined facilities for York University and Ryerson Polytechnical Institute were also described.

Other topics included legal considerations in computing, security, staff training and motivation, and unionization of university computer centres' staff. The last topic included a description of the experiences of the University of Manitoba Computing Centre where the majority of staff are unionized.

Two informal sessions, one chaired by Stan Yagi of UTCC, centered around the everyday problems of the User Services and Operations groups in computer centres. Staff from UTCC presenting papers were John Wilson, Stan Yagi and Derry Cox.

Dave McNaughton

RECENT ACQUISITIONS IN THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Advanced Course on Compiler Construction, Munich, March 1974. Lecture notes.

Anger, A.L. et al.
Computer science: the PL/1 language.
New York, Wiley, 1972.

Cagan, Carl.
Data management systems.
Los Angeles, Melville Pub. Co., 1973.

Coffman, E.G.; Denning, P.J.
Operating systems theory.
Englewood Cliffs, N.J., Prentice-Hall, 1973.

Humby, Edward.
Programs from decision tables.
London, Macdonald, 1973.

IFIP Conference on Human Choice and Computers, Vienna, Apr. 1974. Proceedings.

Judd, D.R.
Use of files.
London, Macdonald, 1973.

Korn, Granino A.
Minicomputers for engineers and scientists.
New York, McGraw-Hill, 1973.

National Computer Conference, Chicago, May 1974.
Proceedings. (AFIPS, vol.43)
Montvale, N.J., AFIPS Press, 1974.

Nivat, M., ed.
Automata, languages and programming.
Amsterdam, North-Holland, 1973.

Percus, J.K.
Combinatorial methods.
New York, Springer-Verlag, 1971.

Pugh, A.L.
DYNAMO II user's manual. 4th ed., including DYNAMO IIF.
Cambridge, Mass., MIT Press, 1973.

Sackman, H.; Borko, H., eds.
Computers and the problems of society.
Montvale, N.J., AFIPS Press, 1972.

cont'd....

LIBRARY Cont'd...

Sackman, H.; Boehm, B.W., eds.
Planning community information utilities.
Montvale, N.J., AFIPS Press, 1972.

Symposium on Mathematical Foundations of the Finite Element Method with Applications to Partial Differential Equations, Univ. of Maryland, 1972.
The mathematical foundations of the finite element method with applications to partial differential equations, ed. by A.K. Aziz.
New York, Academic Press, 1972.

Tsichritzis, D.C.; Bernstein, P.A.
Operating systems.
New York, Academic Press, 1974.

Ullmann, J.R.
Pattern recognition techniques.
New York, Crane, Russak & Co., 1973.

Van Wijngaarden, A., ed.
Revised report on the algorithmic language ALGOL 68.
Edmonton, Univ. of Alberta, March 1974.

Wallis, W.D., et al.
Combinatorics: room squares, sum-free sets, Hadamard matrices.
Berlin, Springer-Verlag, 1972.

Winograd, Terry.
Understanding natural language.
New York, Academic Press, 1972.

Zemanek, H., ed.
The skyline of information processing.
Amsterdam, North-Holland, 1972.

S/370 COMPUTER SHUTDOWN

During the past year, S/370 Services has been investigating the VS operating system. In order to implement the Virtual Storage capability on our S/370 Model 165 an equipment upgrade referred to as the Dynamic Address Translation (DAT) feature is required. If it is decided to proceed with this upgrade, the S/370-165 will be shut down for approximately two weeks in August to allow for engineering changes. This shutdown is tentatively scheduled for the period from midnight, Friday August 2 until 8 a.m. Monday, August 19. Users who expect to encounter scheduling difficulties as a result of the shutdown should contact Stan Yagi at 928-7331 or Derry Cox at 928-7092 as soon as possible.

It is important to remember that this shutdown is dependent upon a final decision to upgrade the S/370-165 with a DAT. Please watch HOTNEWS and the bulletin boards in the service areas for additional information.

Stan Yagi

HOURS OF SERVICE -- CIVIC HOLIDAY WEEKEND

The hours of service which will be in effect for S/370 Services users during the Civic Holiday weekend (Saturday, August 3 through Monday, August 5) are contingent upon a final decision to upgrade the S/370-165 with a DAT. Refer to the article S/370COMPUTER SHUTDOWN appearing in this issue of COMPUTERNEWS for details.

Don Gibson

SUMMER EDUCATION SCHEDULE

Three times each calendar year, the University of Toronto Computer Centre presents a series of short courses for the University community. Most of the courses are designed to be "instruction -- problem" sessions. The assignments given in a course will form a basis for classroom discussion.

A schedule and descriptions of courses being offered follows. If you are interested in any of the courses:

1. Read and heed the prerequisites
2. Fill out the registration COMPLETELY. The address you provide will be used for mailing you your confirmation -- use University addresses if possible.
3. Act quickly to avoid being closed out of a course.

For the summer session, all courses will be held on the St. George campus. Registrants will be notified of the room number for the course along with confirmation of enrollment.

The registration form appears at the end of this issue of COMPUTERNEWS. It is pre-addressed and can be mailed free-of-charge via the campus mail.

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EDUCATION SCHEDULE Cont'd...

Introduction to Data Processing

Prerequisite: None
Dates: July 8, 9, 11
Time: 6:30 - 8 p.m.
Maximum # of Registrants: 30
Instructor: K. Fysh

The course is designed for people who have had little or no contact with computer programming. It is recommended as a prerequisite for any non-programmer intending to take an introductory course in any language during this schedule or at a later date. The course will explain the basics of:

> Bits, bytes, hexadecimal arithmetic, storage concepts, machine language, the role of processors/compilers, and program design techniques

The student will have the opportunity to demonstrate and apply the concepts learned by preparing and executing a simple program to meet specifications set by the instructor and through a short quiz.

Introductory Language Courses

The introductory languages offered are intended to act as starters. After completing the course, the student should have a good idea of whether or not he wants to learn the language. Each course will instruct the student in the basic statements and operations of the language. Assignments will be given out, and the lecturer will base his presentations around the assignments. Computing facilities will be made available through the course. The student will be able to evaluate his progress by preparing and running a final assignment.

Introduction to COBOL

Prerequisite: Introduction to Data Processing or experience in another programming language.
Dates: July 15, 16, 18
Time: 6:30 - 8 p.m.
Maximum # of Registrants: 30
Instructor: R. Purdy

COBOL is a language widely used for many business and commercial applications.

Introduction to PL/C

Prerequisite: Introduction to Data Processing or experience in another programming language.
Dates: July 16, 18, 22, 24, 26
Time: 4 - 5 p.m.
Maximum # of Registrants: 30
Instructor: M. Domoney

PL/C is a subset of the PL/I language. PL/I is a versatile language which conveniently processes both numeric and alphabetic input.

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EDUCATION SCHEDULE Cont'd...

Introduction to WATFIV

Prerequisite: Introduction to Data Processing or experience in another programming language.
Dates: July 23, 25, 30, 31, and August 2
Time: 4 - 5 p.m.
Maximum # of Registrants: 30
Instructor: J. Bradley

WATFIV is a subset of the FORTRAN language. FORTRAN is a language oriented towards efficient number processing or "scientific" computing.

Introduction to Job Control Language (JCL)

Prerequisite: Knowledge in and using a programming language.
Dates: July 8, 10, 12, 15, 17
Time: 3 - 4 p.m.
Maximum # of Registrants: 30
Instructor: T. Shafran

Job Control Language is the programmer's means of giving instructions and information to the Operating System. Through JCL requests are made (e.g. memory allocation), information is given to the system (e.g. accounting and class information), and datasets are manipulated. This course is intended to present the basic statements of JCL and explain their uses. The student will be expected to test his knowledge by using JCL to access and manipulate datasets placed on the system by the instructor.

Basic Utilities

Prerequisite: Introduction to Data Processing. A basic knowledge of JCL is advantageous

Dates: July 22, 23, 24, 25, 26
Time: 3 - 4 p.m.
Maximum # of Registrants: 30
Instructor: H. Kugel

The course will provide a survey of the basic utilities most often used to list datasets, to move and backup datasets, and to create and manipulate datasets. The course will be of interest to those people who are starting to use direct access devices for the storage of their data. The utilities surveyed will include the basic UTCC dataset allocation utilities and the IBM utilities associated with dataset usage.

The student will be able to create and use datasets on the system with these utilities and then manipulate those datasets. Access to the system will be provided through the course.

Introduction to Time Sharing Option (TSO)

Prerequisite: Knowledge of a computer language. An elementary knowledge of JCL would be advantageous.
Dates: July 29, 30, 31, and August 1, 2
Time: July 29 -- 1 to 5 p.m. Tutorial sessions to be arranged for remaining dates
Maximum # of Registrants: 100
Instructor: J. Wettlaufer

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EDUCATION SCHEDULE Cont'd...

The course will be a survey of all the facilities available on TSO at UTCC. The topics to be covered include text editing, dataset management, remote job entry, interactive program execution, interactive program debug, and interactive applications. Users who are not currently using TSO but would like to learn to program more effectively with TSO will be interested in this course. The course will also contain sufficient information to interest current TSO users who would like to learn more about the system.

TSO accounts will be available for a one week period for those who attend the 4 hour session on the first day. Terminals will be provided during the tutorial sessions.

GOULD PRINTER/PLOTTER SEMINAR

A seminar on the GOULD printer/plotter will be held Wednesday, July 17 at 2:00 p.m. in the Galbraith Building room 202.

This seminar is open to all users, with or without experience using the GOULD printer/plotter. The seminar is intended to provide users with an opportunity to input their comments and criticisms regarding the present system. S/370 staff will be on hand to answer any questions, and suggestions for improvements and/or additions to the current software are welcomed.

All Welcome!
Coffee and Donuts are on us!

Bob Radcliffe

BOOK REVIEW - THE ELEMENTS OF PROGRAMMING STYLE

There are many books written on digital computer programming. Some of them have even been written by people who know how to program. It is unusual, however, that the author of this review can find a book on digital computer programming that he can recommend without reservation. *The Elements of Programming Style* by Brian W. Kernighan and P.J. Plauger (McGraw Hill Books) is such a book.

It is small and concise, 146 pages in length. Many of you are probably familiar with the classic English grammar primer, *The Elements of Style* by William Strunk Jr. which clearly and concisely describes the basic rules for the correct use of the English language. *The Elements of Programming Style* does the same thing for digital computer programming. It is authored by people who know how to program, and more importantly, by people who know how to read programs, almost a lost art these days. The book describes and illustrates through actual examples taken from programming text some basic rules for expression, structure, input/output, efficiency and instrumentation, and also documentation. A chapter is also devoted to common blunders.

The text is good; the examples concise; the rules well put. It is a must for anyone engaged in serious programming.

Herb Kugel

PL/I (OPTIMIZER and CHECKOUT) UPGRADE

The program products PL/I OPTIMIZING compiler, PL/I RESIDENT library and PL/I TRANSIENT library will be upgraded from release 2.0 to 2.1 on July 1, 1974. The new release of 2.1 PL/I OPTIMIZING compiler fixes 220 known bugs in the old release while the new release for the RESIDENT and TRANSIENT libraries fixes 10 and 5 problems respectively. Please note that the PL/I CHECKOUT compiler release 2.0 remains in effect although it uses the PL/I TRANSIENT library which will be upgraded to 2.1

Users who encounter any problems due to the conversion to the new release or who wish to obtain further information, should contact Kin Fong at 928-4924 (SF116). Similarly, anyone who wishes to use the new release before July 1 or is interested in helping us test it should contact Kin.

Kin Fong

TSO TOPICS

TSO development continues at S/370 Services. We now have available a NSCRIPT command for text formatting and an OFFLINE command for the background printing or punching of small datasets.

NSCRIPT is a text formatting command obtained from the Massachusetts Institute of Technology. The TSO EDIT command is used to create a TEXT file containing both the text to be formatted and special control records; the file is then processed with the NSCRIPT command. The control records specify headings, formatting, page size, pagination, and several other variables in addition to making available a rather simple programming language. Variables may be defined and used.

Documentation of the available options may be obtained by typing HELP NSCRIPT. Full documentation will be published in USERBOOK; copies of the MIT documentation may be obtained from Ian Darwin in SF116, or call 928-7318.

The OFFLINE command, written at UTCC, provides the ability to print a small dataset on the background printer without running a background job. The size of dataset which can be printed varies, usually several thousand lines can be printed. If the dataset you are trying to print is too large, you will get a B37 abend. If this consistently happens you should use a background job. The following example would print a member of a cntl library:

```
offline cntl(job32) 'j jones'
```

The default print location is self-service. Other print locations can be specified as can the 'forms' and 'copies' options of the HASP job card. Further information can be obtained by entering HELP OFFLINE.

Any problems with these new commands may be reported to the advisor in SF117, the terminal co-ordinator, or Ian Darwin in SF116 or at 928-7318.

Ian Darwin

DATA GATHERING EQUIPMENT AND MAGNETIC TAPE

Recently, within our computing community, a user purchased an expensive piece of data gathering equipment which stores data on magnetic tape and then tried unsuccessfully to process the data on both our IBM S/360-65 and S/370-165 digital equipment. He was unable to read the tape. Often tapes produced from this type of equipment are not compatible with IBM drives, and the result is a loss of time, money and effort.

If you are considering buying a system to gather data onto magnetic tape and intend to process the data on our system, please call Herb Kugel at 928-7286. We may be able to help.

Herb Kugel

OS COMPILER UPGRADES

The new release 21.7 compilers of ALGOL(F), COBOL(U), FORTRAN(G), FORTRAN(H) and PL/I(F) will be available through the General Purpose Job Stream as of June 17, 1974. To access them, the user need only to specify

RELEASE = 217

in the EXEC statement in any of the appropriate UTCC catalogued procedures.

The corresponding old release 21.0 compilers will remain as the default compilers until July 1, 1974 when the new release kompilers will become the default. Effective July 1, the old release compilers can be accessed only when the user specifies RELEASE = 210 in the JCL. Note that IBM catalogued procedures do not have the RELEASE option and therefore always access the default release compilers.

If the new release compilers prove satisfactory, the old release compilers will be completely removed from the system on September 1, 1974.

In addition to correcting many bugs in the old versions, the new release compilers function properly in the SYSTEM/370 OS/VS2 Release 2 while the old release compilers do not. Users are urged to begin using the new release 21.7 compilers as soon as possible, as use of the new versions will facilitate their changeover to VS should our present Operating System be upgraded to VS2 Release 2.

If any problems are encountered in the conversion or if further information is desired, please contact Kin Fong at 928-4942 (SF 116).

Kin Fong

SPEAKEASY

SPEAKEASY is a computer language designed to provide users with the means to quickly and simply formulate a scientific problem and obtain the results immediately. It should enable users to make effective use of the computer for their day-to-day or single instance calculations. The language is easy to learn as its form is similar to that of

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SPEAKEASY Cont'd...

scientific mathematics (the hierarchy of operations is identical to that of FORTRAN). SPEAKEASY has the commonly used operations of most scientific disciplines built into its basic structure, e.g. integration, differentiation, vector and matrix operations, eigenanalysis and standard deviation.

In addition to the functional power of SPEAKEASY, the user will find the automatic formatting of results a further convenience. The results of a computation or series of computations are neatly printed or tabulated in the most concise manner possible with automatically generated headings. Thus, the user is relieved of the time-consuming task of setting up the output format of the results.

SPEAKEASY is accessed interactively through TSO; however, no previous knowledge of TSO is necessary to use SPEAKEASY. Entering the LOGON command followed by SPEAKEZ is all that is needed to gain access to the super-calculator or manual mode of SPEAKEASY. The following examples illustrate the power of SPEAKEASY:

Example 1: Find the best fit of a third order polynomial to the following set of x-y coordinates using a least squares criterion.

x:	-2	-1	0	1	2	3	4	5	6
y:	-9	1	1	-3	-5	1	21	61	127

```
  a=array('a0','a1','a2','a3')
:_x=array(-2,-1,0,1,2,3,4,5,6)
:_y=array(-9,1,1,-3,-5,1,21,61,127)
:_coeff=lsqpol(x,y,3); tabulate a coeff

   A           COEFF
   A0           1
   A1          -3
   A2          -2
   A3           1
```

NOTE: All lower case letters are input and upper case are output.

Example 2: Solve the set of simultaneous equations:

$$\begin{aligned} x - y + z &= -4 \\ 5x - 4y + 3z &= -12 \\ 2x + y + z &= 11 \end{aligned}$$

```
  a=matrix(3,3:1,-1,1,5,-4,3,2,1,1)
:_b=matrix(3,1:-4,-12,11)
:_solution=simeq(a,b); print solution
   SOLUTION (A 3 BY 1 MATRIX)
   3  6 -1
```

Example 3: Determine the area enclosed by the unit circle by integration.

```
   x=grid(0,1,.01); y=sqrt(1-x**2)
 :_area=4*totalint(y:x); print area
  AREA =  3.14
```

SPEAKEASY may be described as a cross between FORTRAN and APL. It handles arrays of data similar to APL but is structured along the lines of FORTRAN and has an added advantage over APL in that the workspace is not limited to 36K. Users who have considered APL as a means to solving their problems but who are more familiar with FORTRAN might consider SPEAKEASY as an alternative. Users who wish to obtain the results to their problems quickly and with minimum effort, will find that SPEAKEASY answers their needs.

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SPEAKEASY

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A short course introducing SPEAKEASY is being planned for the computer centre short courses schedule this fall. An announcement will be made in the fall schedule and published in COMPUTERNEWS. Users who would prefer a demonstration in their office or on the nearest interactive terminal should contact Bob Schulte at 928-8701.

Bob Schulte

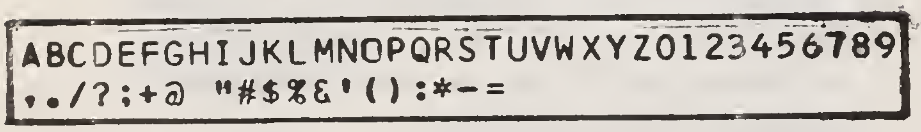
SPECIAL PRINT TRAINS

Many users may not be aware that UTCC supports several print trains. A print train is the part of the IBM 1403 printer that contains the characters used for printing. (Note that printers used at S/370 Services terminals with the exception of EUT, ASUT and Sandford Fleming are not IBM 1403's and do not have print trains).

Each print train can contain up to 240 different characters, but in practice it usually contains less.

PN Train

The standard print train used by System/370 Services is the PN train. It allows the printing of the standard set of characters found on keypunches:

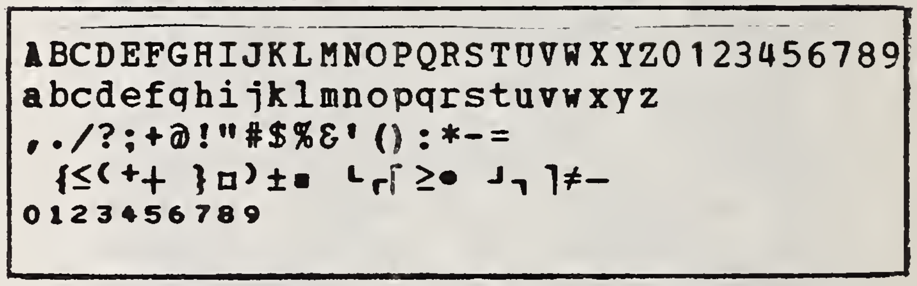


```
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
,./?;+@ "#$%&'():*-=
```

The PN train is used for most printing applications and is the default on System/370 unless the user specifies otherwise.

TN Train

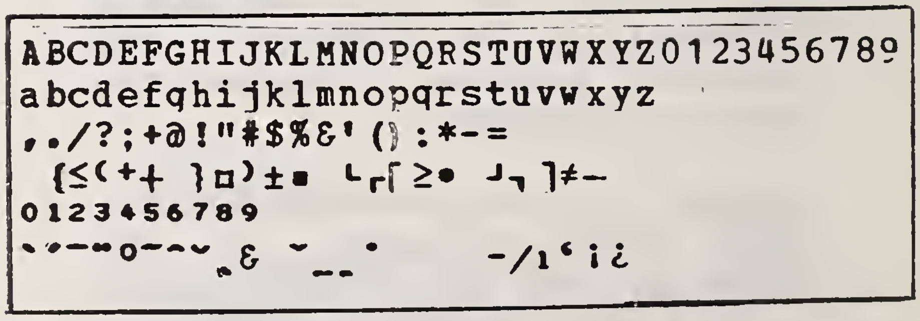
UTCC also has two TN print trains. One is the standard IBM unmodified version; the other is a TN(mod) modified train. The standard TN print train is used for printing ATS documents at Interactive Terminal Systems. It is not available on the S/370-165. The standard TN print train has all the characters on the PN train plus lower case letters and a number of special characters:



```
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
abcdefghijklmnopqrstuvwxyz
,./?;+@!"#$%&'():*-=
 {≤(+┼ }□)±■ └┌⌈≥● ┘┐⌉≠—
0123456789
```

Note that the shape of letters on the TN train is different from those on the PN train.

The TN(mod) print train is available only at the S/370 Services Sandford Fleming Terminal (SF112). It contains all the characters on the standard TN train plus a number of accents which may be used for printing foreign languages.



```
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
abcdefghijklmnopqrstuvwxyz
,./?;+@!"#$%&'():*-=
 {≤(+┼ }□)±■ └┌⌈≥● ┘┐⌉≠—
0123456789
`´¯¨°~^˘¸& ˘__˙     -/ı‘¡¿
```

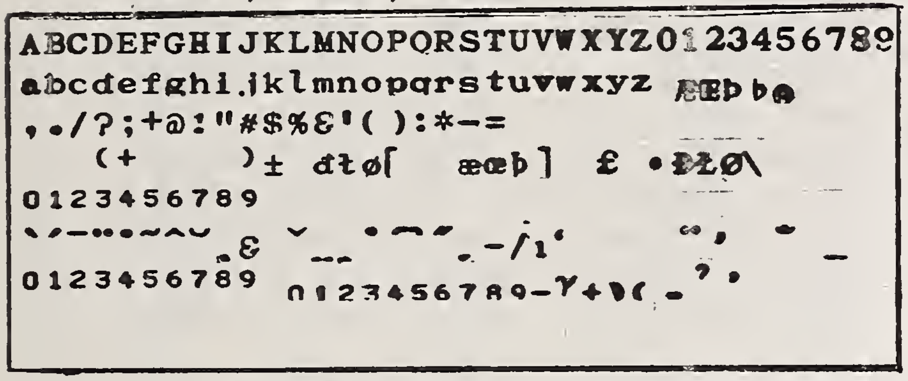
ALA Train

The ALA print train is also available to UTCC users. This print train was designed by the American Library Association in conjunction with IBM. It has most (but not all) of the characters on the TN(mod) print train together with an extensive set of accents.

cont'd...

SPECIAL PRINT TRAINS Cont'd...

This print train can be used to print almost all languages which are based on a Roman typeface (e.g. Hungarian, Czech, Polish, but not Russian, Greek, etc).



```
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
abcdefghijklmnopqrstuvwxyz ÆŒÞþ@
,./?;+@:"#$%&'():*-=
   (+     )± đŧø[   æœþ]  £ •ĐŁØ\
0123456789
`´-¨˙~^˘ ̦& ˇ ‗ ˚ ̑ ˝ ̣-/ı'      ∞,  ˘  -
0123456789 0123456789-Y+)(-  ?,
```

Because of the complexity of the ALA train and its method of implementation at UTCC, users should consult R. Radcliffe (SF116 or phone 928-4924) before using the train.

Although the TN(mod) and ALA trains are used on the S/370-165 for batch jobs, ATS output may be printed on them by routing it from the S/360-65. Instructions for doing this are given in USERBOOK 4.3330. The form number used in this operation is explained in USERBOOK 3.2144.

Bob Radcliffe

HSJS MONTHLY STATISTICS

During May, 92,069 jobs were processed compared to 84,105 for the previous year, an increase of 9.5%.

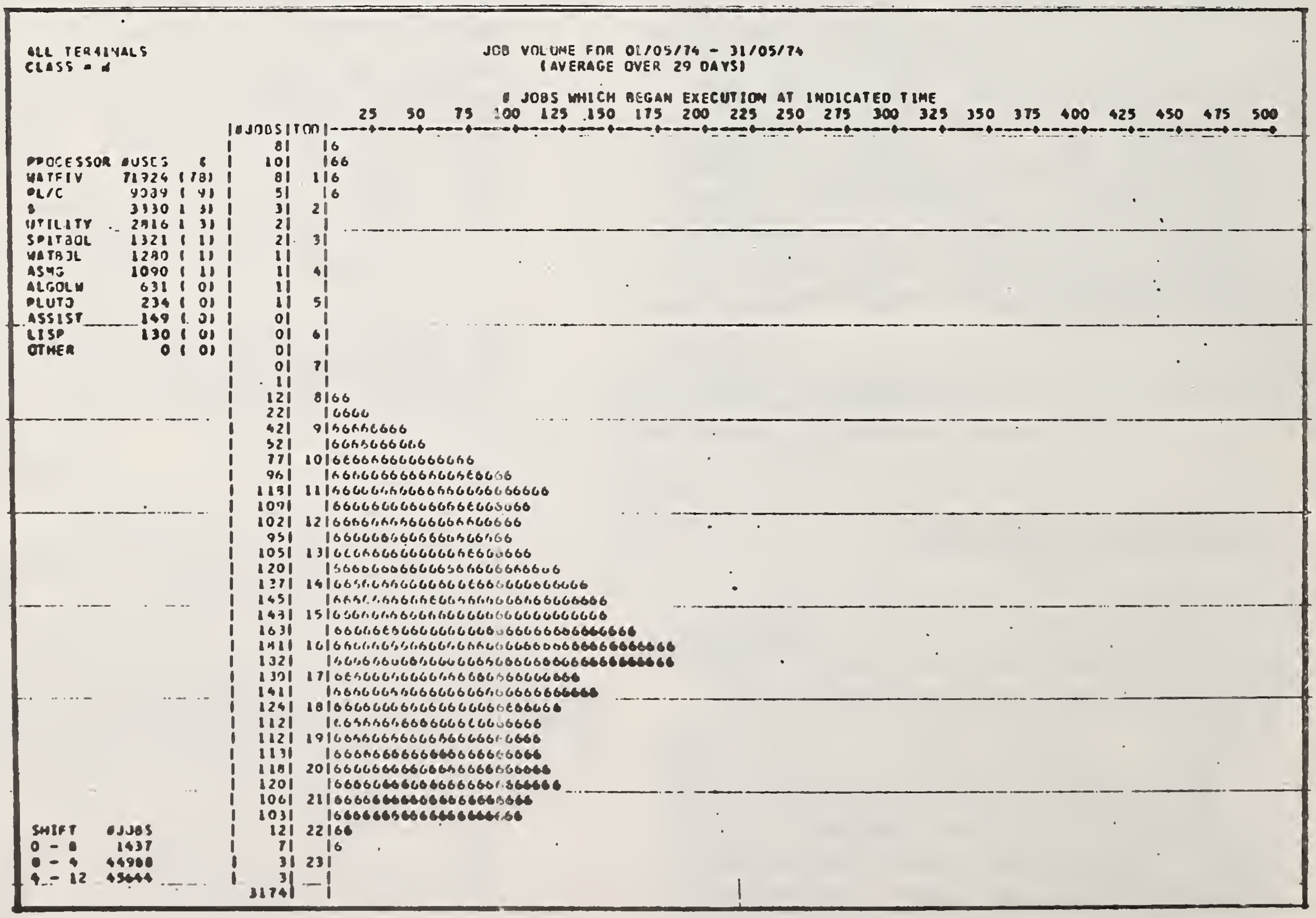
The following charts summarize the HSJS activity for the month of May. The graph represents the average number of jobs processed during each half hour period of the day. The CPU time recorded is in hundredths of a minute.

The format of the graph has been changed from the one appearing in previous editions of COMPUTERNEWS. The old graph included the actual number of jobs submitted during each half hour period with a breakdown by processor. Since the number of processors will probably increase shortly and users are concerned with the number of jobs run and not their type, the processor breakdown has been eliminated and is reported only for the entire period.

Mark Tapia

```
                         HSJS RESOURCE USAGE BY PROCESSOR FOR  1/05/74 TO 31/05/74

              |  TOTAL   |  TOTAL    |  TOTAL    |  TOTAL    ||  AVG    |  AVG    |  AVG   ||
              |  #JOBS   |  CPU      |  CARDS    |  LINES    ||CPU*10   | CARDS   | LINES  ||
---------------------------------------------------------------------------------------------
WATFIV   -W |   74118 |   73891 |10120155 |12379120 ||       9 |     136 |    167 ||
SPITBOL  -T |    1355 |    1888 |  330374 |  320691 ||      13 |     243 |    236 ||
PL/C     -C |    9351 |   13628 |  885755 | 2171918 ||      14 |      94 |    232 ||
UTILITY  -U |    6336 |    3613 |  714893 |  951582 ||       5 |     112 |    150 ||
ALGOLW   -G |     638 |    1044 |   90524 |  133205 ||      16 |     142 |    208 ||
PLUTO    -P |     241 |     319 |   21643 |   26014 ||      13 |      89 |    107 ||
ASMG     -A |    1146 |    2610 |  297203 |  260787 ||      22 |     259 |    227 ||
WATBOL   -B |    1284 |    2057 |  692486 |  191302 ||      16 |     539 |    148 ||
SIMON    -S |      76 |       5 |    2065 |    4166 ||       0 |      27 |     54 ||
ASSIST   -I |       0 |       0 |       0 |       0 ||       0 |       0 |      0 ||
LISP     -L |     149 |     103 |   31310 |   39375 ||       6 |     210 |    264 ||
OTHER    -? |       0 |       0 |       0 |       0 ||       0 |       0 |      0 ||
OTHER    -? |       0 |       0 |       0 |       0 ||       0 |       0 |      0 ||
---------------------------------------------------------------------------------------------
      TOTAL    94694      99158  13186508  16478160          10        139       174
```



```
ALL TERMINALS                                  JOB VOLUME FOR 01/05/74 - 31/05/74
CLASS = A                                           (AVERAGE OVER 29 DAYS)

                                               # JOBS WHICH BEGAN EXECUTION AT INDICATED TIME
                                 25   50   75  100  125  150  175  200  225  250  275  300  325  350  375  400  425  450  475  500
                       |#JOBS|TOD|----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                       |    8|   |6
PROCESSOR #USES   %    |   10|   |66
WATFIV   71924 (78)    |    8|  1|6
PL/C      9039 ( 9)    |    5|   |6
$         3330 ( 3)    |    3|  2|
UTILITY   2916 ( 3)    |    2|   |
SPITBOL   1321 ( 1)    |    2|  3|
WATBOL    1280 ( 1)    |    1|   |
ASMG      1090 ( 1)    |    1|  4|
ALGOLW     631 ( 0)    |    1|   |
PLUTO      234 ( 0)    |    1|  5|
ASSIST     149 ( 0)    |    0|   |
LISP       130 ( 0)    |    0|  6|
OTHER        0 ( 0)    |    0|   |
                       |    0|  7|
                       |    1|   |
                       |   12|  8|66
                       |   22|   |6666
                       |   42|  9|66666666
                       |   52|   |6666666666
                       |   77| 10|666666666666666
                       |   96|   |6666666666666666666
                       |  115| 11|66666666666666666666666
                       |  109|   |666666666666666666666
                       |  102| 12|66666666666666666666
                       |   95|   |6666666666666666666
                       |  105| 13|666666666666666666666
                       |  120|   |666666666666666666666666
                       |  127| 14|6666666666666666666666666
                       |  145|   |66666666666666666666666666666
                       |  143| 15|6666666666666666666666666666
                       |  163|   |66666666666666666666666666666666
                       |  181| 16|666666666666666666666666666666666666
                       |  132|   |666666666666666666666666666666666666
                       |  139| 17|666666666666666666666666666
                       |  141|   |6666666666666666666666666666
                       |  124| 18|666666666666666666666666
                       |  112|   |6666666666666666666666
                       |  112| 19|6666666666666666666666
                       |  113|   |6666666666666666666666
                       |  118| 20|66666666666666666666666
                       |  120|   |666666666666666666666666
                       |  106| 21|666666666666666666666
                       |  103|   |66666666666666666666
SHIFT    #JOBS         |   12| 22|66
0 - 8     1437         |    7|   |6
8 - 4    44980         |    3| 23|
4 - 12   45644         |    3|   |
                        3174|   |
```

S/370 RELIABILITY

Although the reliability statistics when compared to last month's figures indicate a parallel trend with respect to uptime percentages, this month's hardware downtime figures show an increase of approximately 33% over last month's figures. This particular increase was attributed to a recurring failure in the 2803 tape control unit which IBM was finally able to rectify on the 19th of May.

For May, the uptime percentage was 99.2 while the number of unscheduled IPL's per day was 0.87. The scheduled hours of production for May totalled 504.

MONTHLY COMPARATIVE FIGURES

Month	% Uptime	Unsched IPL's/day	Month	% Uptime	Unsched IPL's/day
Jan 73	96.8	0.87	Oct 73	95.6	1.83
Feb 73	98.3	1.18	Nov 73	98.1	0.93
Mar 73	97.8	1.16	Dec 73	98.6	0.62
Apr 73	97.1	1.39	Jan 74	97.0	1.37
May 73	98.5	1.20	Feb 74	98.3	1.25
Jun 73	98.5	1.70	Mar 74	98.7	1.06
Jul 73	99.4	0.37	Apr 74	99.3	0.52
Aug 73	97.6	1.13	May 74	99.2	0.87
Sep 73	86.8	3.63			

The percentage breakdown of total system downtime was: Hardware - 157 mins (61.8%). Software - 37 mins (14.6%), Other - 60 mins (23.6%). The major events contributing to these downtimes were as follows:

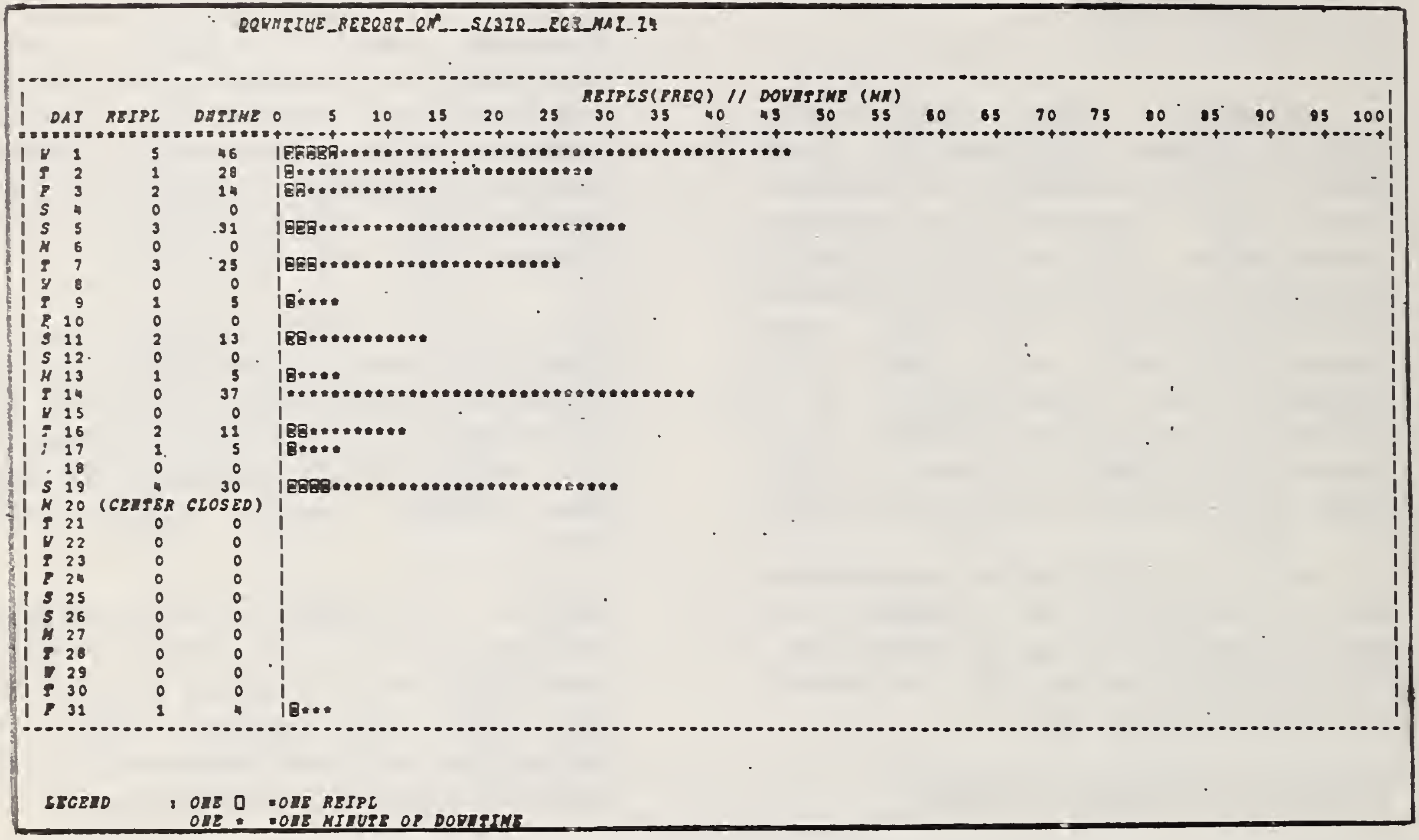
May 1,2,7: A total of 66 minutes of downtime and 5 IPL's were attributed to multiple bit errors in ITEL memory and the amount of time required by ITEL C.E.'s to perform corrective maintenance.

May 5: A total of 21 minutes of downtime and 2 IPL's were attributed to a hardware failure in the 2803 tape control unit which resulted in an unrecoverable system looping condition. IBM was able to isolate a faulty card in the control unit and swap it out.

May 14: A total of 37 minutes of downtime were attributed to a software installation problem in which time was required to restore the SYS1.LINKLIB dataset which had been damaged during system test time.

May 19: A total of 50 minutes of downtime and 4 IPL's were attributed to a hardware problem in the 2803 tape control unit. A defective card was isolated by IBM and successfully replaced.

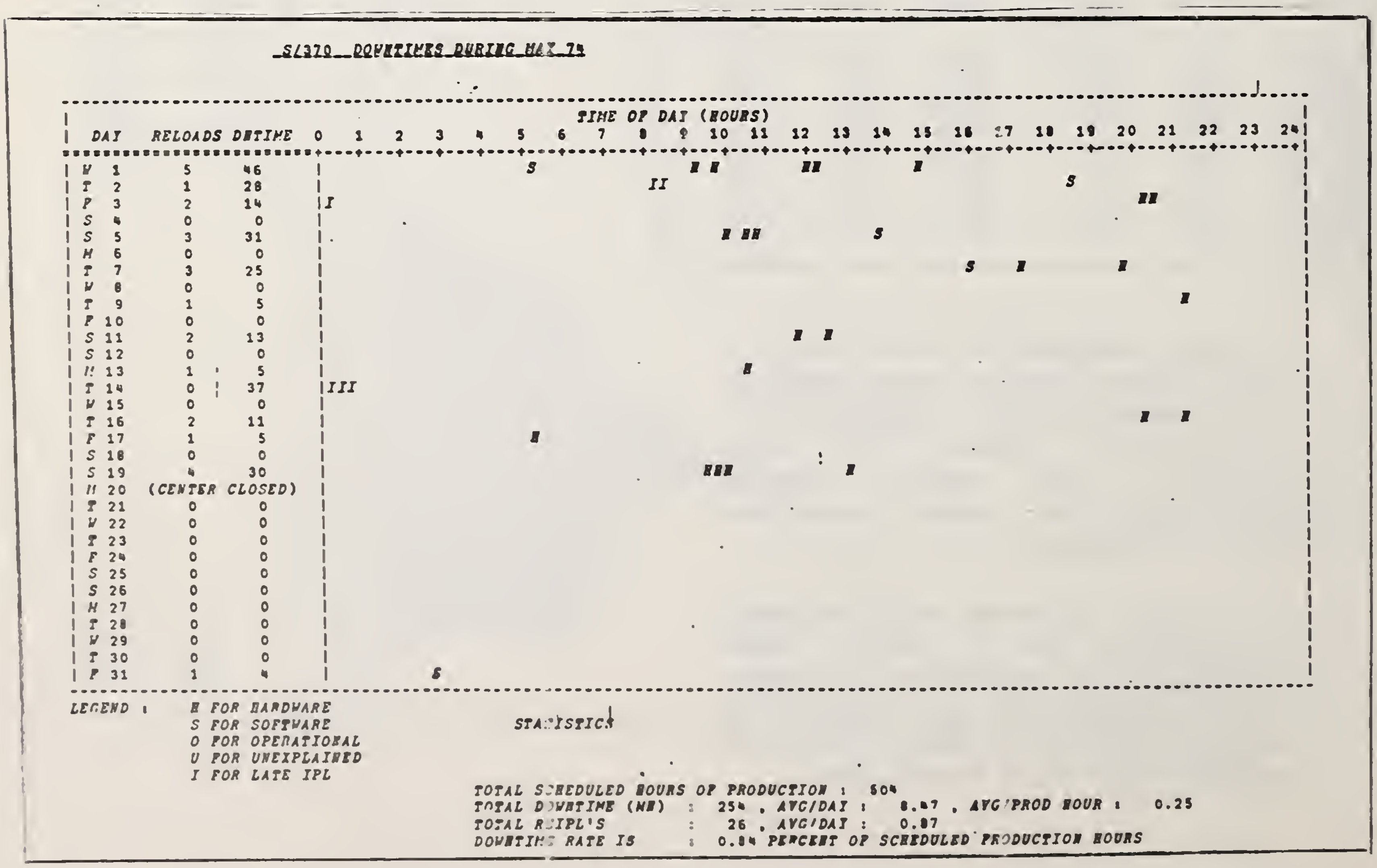
Dave Rauch



```
                    DOWNTIME REPORT ON   S/370  FOR MAY 74

---------------------------------------------------------------------------------------------------------------------
|                                                  REIPLS(FREQ) // DOWNTIME (MN)                                    |
| DAY  REIPL   DNTIME 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100|
**********************+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+|
| W  1      5     46  |□□□□□*****************************************
| T  2      1     28  |□***************************
| F  3      2     14  |□□************
| S  4      0      0  |
| S  5      3     31  |□□□****************************
| M  6      0      0  |
| T  7      3     25  |□□□**********************
| W  8      0      0  |
| T  9      1      5  |□****
| F 10      0      0  |
| S 11      2     13  |□□***********
| S 12      0      0  |
| M 13      1      5  |□****
| T 14      0     37  |*************************************
| W 15      0      0  |
| T 16      2     11  |□□*********
| F 17      1      5  |□****
| S 18      0      0  |
| S 19      4     30  |□□□□**************************
| M 20 (CENTER CLOSED)|
| T 21      0      0  |
| W 22      0      0  |
| T 23      0      0  |
| F 24      0      0  |
| S 25      0      0  |
| S 26      0      0  |
| M 27      0      0  |
| T 28      0      0  |
| W 29      0      0  |
| T 30      0      0  |
| F 31      1      4  |□***
---------------------------------------------------------------------------------------------------------------------


  LEGEND      : ONE □  =ONE REIPL
                ONE *  =ONE MINUTE OF DOWNTIME
```



```
                    S/370  DOWNTIMES DURING MAY 74

----------------------------------------------------------------------------------------------------------------
|                                                    TIME OF DAY (HOURS)                                        |
| DAY   RELOADS DNTIME  0   1   2   3   4   5   6   7   8   9   10  11  12  13  14  15  16  17  18  19  20  21  22  23  24|
************************+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+|
| W  1      5      46   |                    S               H H        HH         H                                      |
| T  2      1      28   |                                II                                         S                      |
| F  3      2      14   |I                                                                                 HH             |
| S  4      0       0   |                                                                                                 |
| S  5      3      31   |                                       H HH            S                                         |
| M  6      0       0   |                                                                                                 |
| T  7      3      25   |                                                               S    H         H                  |
| W  8      0       0   |                                                                                                 |
| T  9      1       5   |                                                                                     H           |
| F 10      0       0   |                                                                                                 |
| S 11      2      13   |                                              H  H                                               |
| S 12      0       0   |                                                                                                 |
| M 13      1       5   |                                         H                                                       |
| T 14      0      37   |III                                                                                              |
| W 15      0       0   |                                                                                                 |
| T 16      2      11   |                                                                                 H   H           |
| F 17      1       5   |                     H                                                                           |
| S 18      0       0   |                                                                                                 |
| S 19      4      30   |                                     HHH            H                                            |
| M 20  (CENTER CLOSED) |                                                                                                 |
| T 21      0       0   |                                                                                                 |
| W 22      0       0   |                                                                                                 |
| T 23      0       0   |                                                                                                 |
| F 24      0       0   |                                                                                                 |
| S 25      0       0   |                                                                                                 |
| S 26      0       0   |                                                                                                 |
| M 27      0       0   |                                                                                                 |
| T 28      0       0   |                                                                                                 |
| W 29      0       0   |                                                                                                 |
| T 30      0       0   |                                                                                                 |
| F 31      1       4   |           S                                                                                     |
----------------------------------------------------------------------------------------------------------------
LEGEND :     H FOR HARDWARE
             S FOR SOFTWARE                     STATISTICS
             O FOR OPERATIONAL
             U FOR UNEXPLAINED
             I FOR LATE IPL

                                   TOTAL SCHEDULED HOURS OF PRODUCTION :  804
                                   TOTAL DOWNTIME (MN)   :  254 , AVG/DAY :   8.47 , AVG/PROD HOUR :   0.25
                                   TOTAL REIPL'S         :   26 , AVG/DAY :   0.87
                                   DOWNTIME RATE IS      :  0.84 PERCENT OF SCHEDULED PRODUCTION HOURS
```

INTERACTIVE SYSTEMS RELIABILITY

The uptimes achieved for the month of May for each of APL, ATS, and CPS respectively, were 99.59%, 99.22% and 99.41% of scheduled operation. The total number of scheduled hours of operation during the month of May was 488. In addition to the scheduled time, APL, ATS and CPS were also available for approximately 132 hours of unattended weekend operation.

Due to year end accounting, Interactive Terminal Services were not scheduled for operation from midnight until 4:30 a.m. on May 1, 1974. The following table summarizes the time lost from the scheduled hours of production due to system failures for each of the systems. Seven unscheduled IPL's were required as a result of the failures.

Kam Jain

DATE	DOWNTIME (mins)			REASON
	APL	ATS	CPS	
Thu. May 2	-	90	10	Proclib Error (SOFTWARE)
"	11	13	22	*Machine Check (HARDWARE)
Wed. May 8	4	5	8	*Operating System SQA (SOFTWARE)
Mon. May 13	6	9	10	*APL Slowdown (SOFTWARE)
Sun. May 19	29	30	31	*Power Drop Disk Control Unit (HARDWARE)
Mon. May 27	30	34	36	*Multiplexor Ch. (HARDWARE)
Thu. May 30	30	32	35	*Solid System Channel Error (HARDWARE)
"	11	14	15	*Solid System Channel Error (HARDWARE)
Total	121	227	172	*IPL Required

System Failures May 1 to May 31, 1974

S/360-44 FIVE YEARS OF SERVICE

Five years ago last January, a group of graduate students, professors, and a handful of employees watched with some excitement the arrival of a number of large, taped up cabinets, the beginning of the IBM S/360-44 which was to become the main element of a new department, The Computer Research Facility. Despite protestation to the contrary, the graduate students of the Electrical Engineering Computer Group felt that this was their computer. Future events did little to dispell this feeling, as students were allowed hands-on use of the S/360-44 and keys to the lab so that they could use it at any hour. The initial OS sysgen, performed at IBM, was done under the able direction of Mr. Craig King, then a graduate student with the Computer Group. For the next few years, this group of about ten graduate students spent many more hours than required by their studies in developing programs and systems which would become the main elements of future CRF services. In developing this system, the graduate students involved learned more about computers, operating systems and computing in general than could have been found in all the currently available computer courses. For CRF users outside this group, the S/360-44 provided what was then, an unrivalled service for high speed data acquisition over multi-conductor cables up to a mile in length. Even for these services, software was developed by students and professors of Electrical Engineering and CSRG.

As one of the original graduate students who watched the arrival of the first S/360-44 boxes, it has been with mixed feelings that I have attended the final days and departure of the S/360-44. All that remains now of the original system are the RADDT's and a few inactive units awaiting final disposition.

I hope that CRF and all of UTCC, of which CRF is now a part, will be able to continue offering services which allow students to learn about computing and computers and not just how to use them as tools.

Dennis Smith

DEC GT44 - A NEW ARRIVAL

On the less nostalgic side, and perhaps of more interest to new users is the arrival of a new DEC PDP-11 graphics system. The current configuration of this system contains the following components:

1	PDP-11/40 CPU with 24k words memory (48k bytes)
2	RK05 1.2 M word disk drives
1	VT14 graphics display device
1	600 lpm line printer
1	1000 cpm card reader
1	800/1600 BPI, 75 ips tape drive
1	30 cps console device

Currently on order, but not installed at time of writing:

1	digitizing tablet
1	paper tape reader/punch
1	lab peripheral system (A to D, D to A)
1	line frequency clock
1	asynchronous communications interface
1	Floating Point Hardware

cont'd...

DEC GT44 - A NEW ARRIVAL Cont'd...

The following software is currently available on the system:

RT-11-operating system (single user)
MACRO-11-assembler
BASIC GT-BASIC with comprehensive graphics support, file support and character strings.

FORTRAN IV (not yet arrived)
LAB APPLICATIONS SOFTWARE (not yet arrived)

A small number of manuals on this system are available on loan from CRF, more should be available in about a month.

The GT-44 system with the Lab Applications software, will be a powerful graphics/computer system. High speed A-D and D-A conversions will be handled (replacing the RADDTs) and digitized data can be manipulated and displayed (replacing the 2250 and RADGRAPH software).

Our plans for the near future include a high speed communication link with the S/370-165, and the necessary software on the GT-44 to support RJE/HASP. Thus programs and data can be easily transferred from CRF to either the S/370-165 or the S/360-65. Calculations on the data collected on the GT-44's data acquisition system can be performed on the GT-44 itself, on the 165 under TSO or HASP, on the 65 under APL.

Calcomp, Minus the S/360-44

Now that the S/360-44 is no longer available, a new but compatible Calcomp microfilm system is available. This system uses a DEC PDP11-05 to drive the Calcomp 16mm Microfilm plotter, using Integer Compressed Format tapes which may be created on the S/370-165. These tapes differ from the old format tapes, but old 360 tapes may be converted via a 370 catalogued procedure CALCONVT.

The Calcomp subroutines are available on the S/370-165 to produce new format tapes. These routines may be accessed by means of a catalogued procedure CALFORT, and are documented in the manual Programming the Calcomp 835 Plotter available at the CRF offices. Documentation on the above catalogued procedures is available from Krishna Patnaik in the CRF lab.

Dennis Smith

IBM 2250 ON THE S/370-165

The 2250 display unit is currently still in the CRF lab, but is connected to the S/370-165. We would recommend that users not begin new projects on this system, as its days at U of T are numbered.

Current 2250 users should contact John Morton in Room SF214 if they wish to continue using the 2250 display.

cont'd...

IBM 2250 ON THE S/370-165 Cont'd...

Users wishing to start new graphics projects may be interested in the DEC GT44 system decribed earlier in this issue of COMPUTERNEWS, or in the GT-40 graphics system. Both the GT-40 and the GT-44 graphics systems have IBM compatible 9 track mag tape drives. The display processors on both machines are compatible, the only differences being that the GT-40 is built around a PDP-11/05 and has an 11" display and the GT-44 is built around a PDP-11/40 and has a 17" display.

Dennis Smith

RADDT SUPPORT ON THE S/370-165

Both new and old RADDT (Remote Analog Digital Data Acquisition Terminal) users are assured that this service will still be provided via the S/370-165. Documentation and help in using the new system may be obtained from John Morton Room SF214.

A new and expanded service in this area is under development at CRF and should be available sometime this fall.

Dennis Smith

U of TORONTO data talk DIAL 928-8710

INTRODUCING DATATALK

University of Toronto DATATALK services have been available to UTCC staff since May 1st, and are now available to the University community, Monday through Friday, 10 am to 10 pm.

With a little experience behind us and an ambitious advertising campaign ahead of us, this is a good time to introduce COMPUTERNEWS readers to some of the secrets of DATATALK ways and means.

DATATALK offers immediate over-the-telephone computation and computing services for everyone, from people with almost no experience of computing to people who know a great deal about computing.

Briefly, we're doing arithmetic you might have done on a desk calculator; we're doing interest and mortgage calculations; we're doing linear programming, and numerical integration; we're interpolating, extrapolating, fitting curves, solving equations, finding zeros, inverting matrices, calculating eigenvalues, and eigenvectors, evaluating functions; we're summing series, sketching curves, and calculating statistics.... and we're very reluctant to say "no, we can't do that"!

DATATALK is an APL-based service, and I apologize now for including APL examples and urge those of you not familiar with APL to skip or skim them, no harm done!

Although we are creating new APL programs during every telephone conversation with a DATATALK subscriber, we have our own DATATALK workspaces, derived in part from the APL public libraries, designed to speed up the process of getting answers quickly, but in a comprehensible form. Some of these enable the DATATALK operator to run problems which would ordinarily require a great deal of programming and are useful to many potential DATATALK users.

For example, a multiple correlation study could begin with the APL instruction:

```
OUTPUT T←MPXREG DATA
```

where *MPXREG* solves the correlation equations, using data dictated by the DATATALK subscriber and typed in to the *DATA* array; the solution data is stored in the array *T* and is typed out with identifying notations by the function *OUTPUT* .

But not all our programming is so cut and dried. To help us be more innovative, we are continually adding short algorithms to the workspaces which are likely to be useful or which serve as models for any number of modifications.

For example, in the *MATH1* workspace, we have a collection of inter-related functions and variables which enable us to rapidly redefine functions to be evaluated at several points over an interval , to be listed, integrated with any of several techniques, plotted, summed, etc.

cont'd...

DATATALK Cont'd...

Thus, the following lines of typein:

```
∇F[1] Y←X*2∇

 Y←FN X←IOTA L←¯1 0.02 1
```

would provide the DATATALK operator with all the arguments needed for a formatted listing of x and f(x) for x=-1, -0.98,...0, 0.02,.....0.98. 1.0; or for a numerical integration of f(x), zero-search, series summation, plotted sketch, or minimum search. Here, of course, f(x) was the square of x, but functions of many types can be similarly handled.

Desk calculation, as easy and convenient as your telephone, is our basic DATATALK service; however, some of our subscribers with no experience of computers are rapidly becoming quite knowledgeable about DATATALK capabilities. Here's an example similar to one recently requested by a DATATALK subscriber:

PROBLEM: Plot $F(x) = {}_{0}^{x}\ (1 - x^{3})^{-2/3}\ dx$
and $G(x) = \arcsin(x)$

on the same coordinate axes,
step size 0.02, 0 x 1

The solution was programmed and run in less than 9 minutes, providing a formatted list of x, F(x), and G(x), as well as a sketch plot (all mailed to our subscriber in the next Campus Mail delivery), with just the following seven lines of APL typein:

```
      ∇F[1]
 [1]  Y←(1-(X←IOTA 0 0.002,X)*3)*-2÷3

 [2]   Y←(0,X[ρX]) TRAP Y∇

       Y←FN X←IOTA 0 0.02 0.98

       G←ARCSIN X

       X LIST Y,G

       50 50 PLOT Y AND G VS X
```

DATATALK is using several devices to assure subscribers of a no-fuss signon procedure as well as account security.

Account identification is based on surname and password, with use of initials and/or department where the surname is not sufficient. When a subscriber phones, he first states his name, and as soon as the DATATALK operator types this in, the password most recently chosen by the subscriber is first typed back and then immediately blotted out. Meanwhile, the subscriber should have used his password in casual conversation, so that he is positively identified to the DATATALK operator. The DATATALK operator is then immediately ready to proceed with the calculation or programming assignment. At the end of the conversation, the subscriber may choose to modify his password for future calls. The typewritten transcript of the phone session is then addressed to the subscriber automatically, using UTCC's central up-to-date address file, and is ready to be folded and inserted in a window envelope for immediate delivery.

cont'd...

DATATALK Cont'd...

In summary, then, we know exactly who we're talking to, we don't run jobs without exercising discretion, and finally, all output is sent to the subscriber identified by the name and password during signon.

DATATALK has other channels of communication with its subscribers too. After hours, or when the DATATALK line is busy, the telephone is answered by our tape recorder, so that you can leave your name and number for us to call you back. DATATALK is also accepting written problem statements when the problem is too complex or includes too much input data for convenience in telephone conversation. We will also accept telephoned problem statements for later processing, allowing our user to ring off immediately and get his answers later.

Other promising DATATALK services centre around file creation, updating, and extracting for a subscriber, his colleagues, and co-workers. We can take in field data or enquiries over the telephone, or, (using the XFR system), from any UTCC System/370 terminal into an APL-PLUS file, for DATATALK conversational analysis. Of course, voluminous file printing can be done on the System /360 high speed printer.

Although a good sketch plot of data can be created as a part of normal DATATALK output, we can also produce graphic output on the System /370 Calcomp or Gould plotting facility, by using the XFR system to transfer APL file data to the S/370 and initiate the S/370 plot job.

Finally, when all our resources fail us (and they sometimes do!), DATATALK can arrange APL and/or System /370 contract programming.

All DATATALK details will be documented in UTCC USERBOOK Section 7, but phone us. We'd be glad to hear from you. A special DATATALK brochure and DATATALK phone stickers will be available soon.

Ernst Goetze

The following article is reprinted with the permission of the Faculty of Applied Science and Engineering, University of Toronto. The article originally appeared in ENGINEERING FORUM, May 1974, Volume 25.

A COMPUTERIZED DATA PROCESSING SYSTEM FOR STEREOTACTIC NEUROSURGERY

by I. H. ROWE

Stereotactic neurosurgery involves the probing of deep intracranial regions of the human brain using mechanically directed instruments. It is common in the treatment of hyperkinesis, Parkinsonism, intractible pain and convulsive disorders. In particular, Dr. R. Tasker, a neurosurgeon at Toronto General Hospital, applies the technique for the control of involuntary movement (such as tremor) and for the relief of pain. In this procedure, a target site is selected in the thalamic tract, a thin electrode probe is introduced through a burrhole and a lesion is made at the target site with radio frequency current. Mutilation of the brain is thereby minimized, as is the possibility of haemorrhage.

Stereotactic surgery is not an open operation and the intracranial target site cannot be localized visually. With x-rays, three prominent cranial landmarks can be identified. They are the anterior commissure (AC), the posterior commissure (PC) and the mid-line of the brain. From anatomical studies, atlas templates of "standard" cranial structures have been drawn. Based on anticipated anatomical differences, a number of tentative target sites can be chosen geometrically related to the landmarks. But just where should the final lesion(s) be made?

Under local anaesthesia, an electrode is introduced through the burrhole and advanced towards the tentative sites (See Figure 1) As the probe is advanced at 2 mm increments, it is stimulated with electrical pulses at 100Hz, eliciting a response in the patient. By examining the stimulation response evoked at each site as reported by the patient, the neurosurgeon can search for and home in on the proper lesion site. Luckily, the thalamic region of the human brain is arranged in an orderly fashion so that stimulation of the same region in different patients will evoke the same response However, there may be up to 60 stimulation sites with as many as 3 to 5 responses at each site, resulting in a mass of data to be absorbed and acted upon in the operating room. To solve this problem, a computer program operating in real time mode has been developed to provide an operative template and a response map incorporating all the stimulated response data in pictorial form so that the surgeon can select his lesion site efficiently.

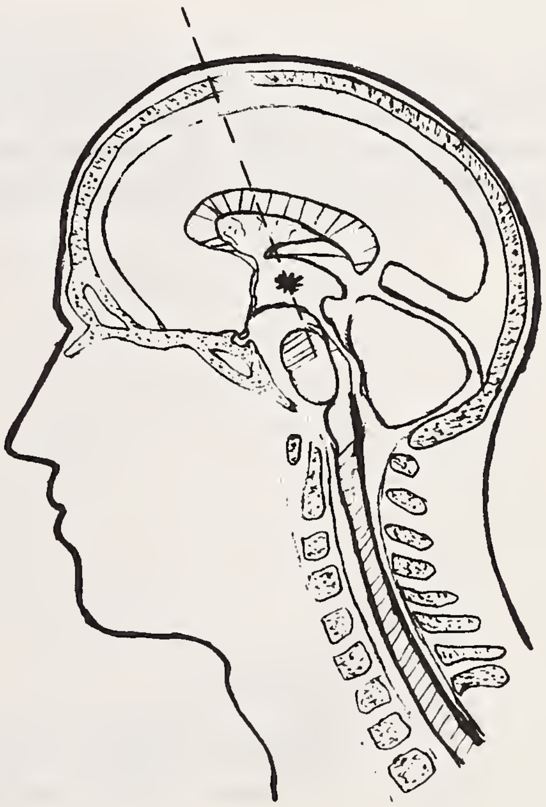
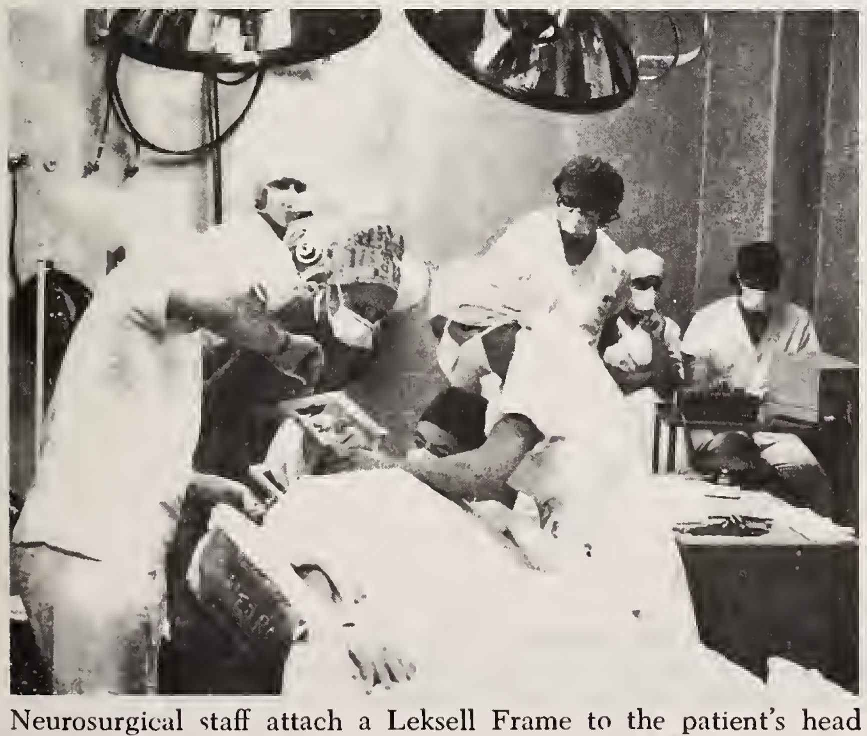


Fig. 1 — A lesion site deep in the thalamic tract along the probed pathway is shown.



Neurosurgical staff attach a Leksell Frame to the patient's head in preparation for stereotactic surgery. — *Photo: Pearce A-V*

In the operating room, the neurosurgeon's assistant enters the data into a portable computer terminal connected to the main computer via telephone. The terminal operates in an interactive mode under control of a program written in the

APL language. The program instructs the assistant on what data to enter, examines it for departure from expectation, and, if acceptable, files it in an on-line data set for final processing. When all the evoked responses and other operating inputs are fully entered, the execution of a FORTRAN plotting program on the University of Toronto Computer Centre's IBM System 370/165 is initiated remotely. The plotting program accesses the on-line data set and transforms the data from the operation into graphical output, the operative template and the Woolsey-type figurine mapping shown below. A Gould plotter prints out the result shown in Figure 2 in less than ten seconds. Simultaneously, the high speed printer provides the data in tabular form for future reference. From the figurine map and template, the neurosurgeon can choose the final site for making a lesion so that the operation can be brought to a quick but satisfactory conclusion.

PROFESSOR IAN ROWE *is Associate Chairman of the Division of Engineering Science. Much of his research is directed towards instrumentation and signal processing for biomedical applications. This work was supported by the Toronto General Hospital Foundation.*

Fourth year Engineering Science (Computer Science Option) student Peter Hawrylyshyn explains the display at the computer terminal. Peter wrote the programs for this project for his final year thesis. — *Photo: Pearce A-V*

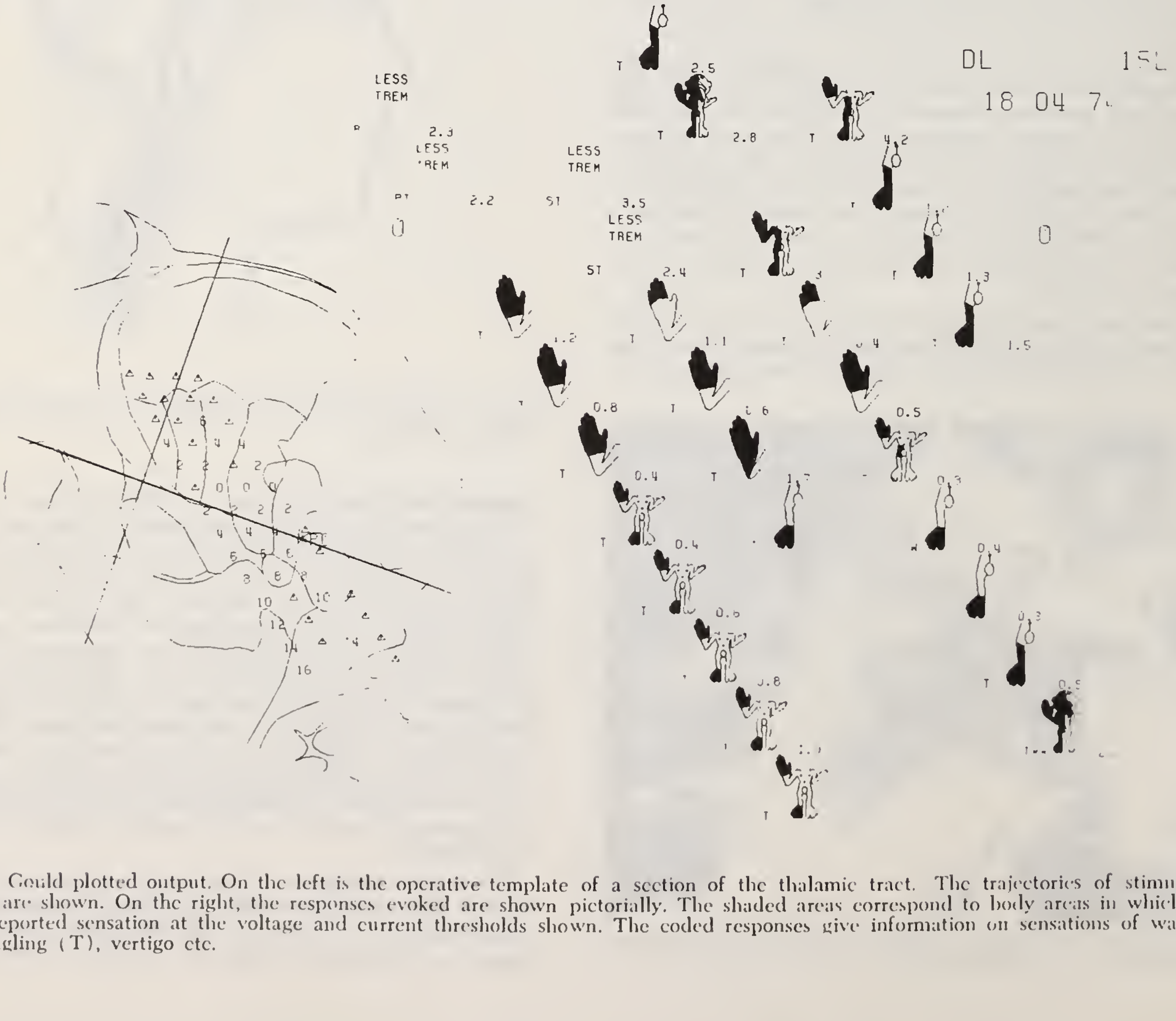


FIG. 2 — Gould plotted output. On the left is the operative template of a section of the thalamic tract. The trajectories of stimulated response are shown. On the right, the responses evoked are shown pictorially. The shaded areas correspond to body areas in which the patient reported sensation at the voltage and current thresholds shown. The coded responses give information on sensations of warmth (W), tingling (T), vertigo etc.

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- located in SF103/105/112
- provides General Purpose Job Stream, High Speed Job Stream and TSO services
- 3072K bytes of memory
- 1 drum
- 12 disk drives IBM (3330)
- 8 disk drives IBM (2314)
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 5 card readers
- 1 card punch
- 7 remote batch terminals
- 1 paper tape reader
- Calcomp plotters (11" and 30")
- Gould plotter (11")
- OS/MVT with HASP

SYSTEM/360 MODEL 65

- located in McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 140 typewriter terminals
- OS/MVT with APL, ATS, and CPS

7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

IBM/360 MODEL 44

- located in SF207
- 256K core
- 10 disk drives (8 2314's and 2 2311's)
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- 2 1403 printers
- 2 2501 card readers
- 2701 data adapter
- 2250 video display unit
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